

What is claimed is:

1. A substrate processing method for heating a substrate to be processed to a predetermined temperature, the substrate being held by holder and also accommodated in a processing container equipped with heater, and further processing the substrate to be processed while supplying a processing fluid into the processing container, the method comprising the steps of:

moving the substrate to be processed close to a heating surface of the heater relatively thereby to heat the substrate to be processed to a processing temperature;

moving the substrate to be processed apart from the heating surface of the heater to a processing position after heating the substrate to the processing temperature; and

supplying the processing fluid into the processing container.

2. A substrate processing method as claimed in Claim 1, further comprising the steps of:

making the holder receive the substrate transferred from the exterior of the processing container at a delivery position before bring the substrate and the heating surface of the heater into relative closer relationship; and

discharging the processing fluid for processing from the interior of the processing container after supplying the processing fluid into the processing container.

3. A substrate processing method as claimed in Claim 1, wherein in the step of supplying the processing fluid into the processing container, the holder and the heating surface of the heater are relatively moved close

to and apart from each other intermittently or continuously.

4. A substrate processing method as claimed in Claim 2, further comprising the steps of:

opening a lid body forming the processing container before making the holder receive the substrate at the delivery position;

closing the lid body after bringing the substrate and the heating surface of the heater into relative closer relationship and before a temperature of the substrate reaches to the processing temperature; and

after discharging the processing fluid for processing from the interior of the processing container, again opening the lid body, transferring the substrate from the processing position to the delivery position and unloading the substrate out of the processing container.

5. A substrate processing method as claimed in Claim 1, wherein

the holder is capable of moving in and out of a processing chamber thereby plunging into the processing chamber through the processing container,

the substrate to be processed is supported by the holder horizontally, and

the holder is moved vertically to make the holder and the heating surface of the heater close to and apart from each other relatively.

6. A substrate processing method as claimed in Claim 1, wherein the flowing direction of the processing fluid in a processing chamber is generally perpendicular to the close-and-apart moving direction of the holder and the heating surface of the heater.

7. A substrate processing method as claimed in Claim 6, wherein the processing fluid is supplied so as to diffuse in the plane direction of the substrate arranged in the processing container and further bypass in a direction generally perpendicular to a diffusing surface of the substrate.

8. A substrate processing apparatus comprising:

- a processing container for accommodating a substrate to be processed, the processing container having a supply port for supplying a processing fluid into the processing container;
- holder for holding the substrate in the processing container;
- heater provided to the processing container for heating the substrate to a predetermined temperature;
- a supply pipeline connected to the supply port;
- valve interposed in the supply pipeline;
- a processing fluid source for supplying the processing fluid into the processing container through the supply pipeline;
- close-and-apart moving mechanism for moving the substrate held by the holder close to or apart from a heating surface of the heater relatively; and
- controller for controlling the close-and-apart motion of the close-and-apart moving mechanism and the open-and-close operation of the valve.

9. A substrate processing apparatus as claimed in Claim 8, further comprising a connecting member arranged outside the processing container,  
wherein the holder includes

- a plurality of holding rods arranged so as to penetrate the processing container movably in a fluid-tight manner through a through-hole formed in the processing container and project into the processing

container; and

holding members arranged at respective tips of the holding rods to support the underside of the periphery of the substrate thereby holding it horizontally,

and wherein the holding rods are connected, at their parts outside the processing container, with the close-and-apart moving mechanism through the connecting member.

10. A substrate processing apparatus as claimed in Claim 9, wherein each of the holding members has a holding part for supporting the lower surface of the periphery of the substrate and a standing part formed to stand upwardly from the outer portion of the holding part over the upper surface of the substrate, the standing part having an inside surface inclined to the holding part so as to gradually reduce a thickness between the inside surface of the standing part and the outer circumference of the standing part as directing upward.

11. A substrate processing apparatus as claimed in Claim 8, wherein the close-and-apart moving mechanism includes a motor rotatable in both direction and a ball screw mechanism having a converting part to convert the rotational movement of the motor to a linear movement.

12. A substrate processing apparatus as claimed in Claim 8, wherein the controller controls the close-and-apart moving mechanism in a manner that the substrate to be processed moves to a delivery position where the substrate is delivered into the processing container, an adjacent position where the substrate is opposed to the heating surface of the heater and a processing position where the substrate is apart from the heating surface of

the heater over the adjacent position, and further controls the opening-and-closing operation of the valve in the supply pipeline in order to supply the substrate at the processing position with the processing fluid.

13. A substrate processing apparatus as claimed in Claim 12, wherein the controller further controls the close-and-apart moving mechanism in a manner that the substrate at the processing position moves close to and apart from the heating surface of the heater intermittently or continuously.

14. A substrate processing apparatus as claimed in Claim 8, wherein

the processing container has a container body and a lid body,

the heater is arranged in a horizontal bottom part of the container body forming the heating surface,

the processing container has a fluid supply port and a drain port formed at opposing parts of a sidewall standing from the periphery of the horizontal bottom part, and

the lid body is movable up and down in the vertical direction and also adapted so as to close an opening of the container body through a seal member.

15. A substrate processing apparatus as claimed in Claim 12, wherein

the processing container includes a container body having its horizontal bottom part provided with the heater to form the heating surface, the container body having a fluid supply port and a drain port for the processing fluid, and a lid body that is movable up and down and is adapted so as to close an opening of the container body through a seal member, and

the moving of the substrate between the adjacent

position and the processing position is carried out under condition that the container body is closed by the lid body.

16. A substrate processing apparatus as claimed in Claim 14, wherein the processing container has a communication path to communicate the fluid supply port with the interior of the processing container, the communication path having a bypass part having a diffusion groove extending from the fluid supply port to both sides thereof and a sagging piece plunging into the diffusion groove.

17. A substrate processing apparatus as claimed in Claim 15, wherein the lid body further includes another heater.